REMARKS

Reconsideration and allowance of the subject application are respectfully requested. Claims 1, 9, 11, 25, 29 and 30 have been amended with claims 1 and 25 being independent. Claims 32 – 42 have been added. Claims 2, 3, 10, 26 and 27 have been deleted.

New Claims

New dependent claims 32-42 are added to this application and further define the inventive features supported by the present application. Favorable consideration of these claims is earnestly solicited.

Priority

The Examiner has acknowledged receipt of a certified document of the priority document and has requested a copy of the cover page of the certified priority document. Applicants direct the Examiner's attention to the attached copy of the cover page of the certified document.

Disclosure Objection

The Examiner has objected to the specification citing minor grammatical errors. Applicants direct the Examiner's attention to amendments to the specification making the Examiner's objection moot. Applicants request that the Examiner indicate acceptance of the amendments to the specification.

Drawing Objection

The Examiner has indicated that the drawings are objected to for allegedy failing to comply with 37 C.F.R. § 1.84(p)(s). Applicants direct the Examiner's attention to the specification amendments changing reference numbers 59 on page 10, line 11, and reference number 55 on page 8, line 12, to reference numbers 51 and 53, respectively. Therefore, the Examiner's objection is moot. Applicants request that the Examiner accept the drawings filed October 30, 2000.

Rejection Under 35 U.S.C. § 112, Second Paragraph

Claims 11, 29 and 30 stand rejected under 35 U.S.C. § 112, second paragraph as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicants regard as the invention. This rejection is respectfully traversed.

Applicants direct the Examiner's attention to the amendments of claims 11, 29 and 30, which render the asserted instances of indefiniteness moot.

Applicants direct the Examiner's attention to amended claims 11 and 29 where the multiple ranges have been removed, and claim 30 where the alleged indefinite language "such as" has been removed.

In view of the above, Applicants respectfully request reconsideration and withdrawal of the outstanding rejections under 35 U.S.C. § 112, second paragraph.

Prior Art Rejections

1. Rejection under 35 U.S.C. § 102 (b) based on Tosswill

Claims 1, 2, 25 and 26 stand rejected under 35 U.S.C. §102(b) as being anticipated by Tosswill (U.S. Patent No. 4,608,519). This rejection is respectfully traversed.

Claim 1 is directed to an apparatus for detection of radiation having a photocathode layer, a radiation entrance, and an electron avalanche amplifier facing the first surface of said photocathode, wherein the radiation entrance is arranged so that the beam of radiation can be entered into the apparatus between the photocathode layer and the electron avalanche amplifier.

Claim 25 is directed to a method reciting functions of the structure set forth in claim 1.

Tosswell is directed to a middle-infrared image intensifier having an input window 16 transparent to the middle infrared wavelengths and a photoconductor 27 activated by middle infrared wavelengths attached to the face 26 of a microchannel plate 24. Middle infrared light entering the input window activates electrons from the photoconductor 27 which are then accelerated through the electron mulitplier (microchannel plate 24) and impinge a phosphorous screen 22 (Tosswell, Figure 2 and 2A; col. 2, ll. 16-34).

Tosswell fails to disclose that the radiation can enter between the photocathode layer and the electron avalanche amplifier. If this rejection is maintained, Applicants request that the Examiner indicate specific passages in Tosswell that allegedly show such a condition. In an embodiment of the present

invention, the radiation can impinge on the photocathode at an angle from a direction away from the electron avalanche amplifier (Present Specification, Figure 1). Such an orientation is not possible in Tosswell and in actuality defeats the purpose of Tosswell to provide night vision capability (Tosswell, col. 2, ll. 6-7).

For anticipation under 35 U.S.C. § 102 "A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." Verdegaal Bros. v. Union Oil Co. of California 814 F.2d 628, 631, 2 U.S.P.Q.2d 1051, 1053 (Fed. Cir. 1987)(M.P.E.P. 2131). For reasons stated above Applicants assert that all of the elements of claims 1 and 25 fail to be set forth in the embodiment shown in Tosswell and, thus, Tosswell fails to anticipate claims 1 and 25.

Applicants direct the Examiner's attention to the cancellation of claims 2 and 26 making the Examiner's rejection moot.

In view of the above, Applicants respectfully request reconsideration and withdrawal of the outstanding rejection under 35 U.S.C. § 102 based on Tosswell.

2. Rejection under 35 U.S.C. § 102 (b) based on Johnson

Claims 1-3, 5-12, 14, 17, 19-23 and 25-29 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Johnson (U.S. Patent No. 4,339,659). This rejection is respectfully traversed.

Johnson is directed to an image converter for converting energy images to visual images. Johnson is similarly structured as Tosswell and fails to disclose that the radiation can enter between the photocathode layer and the electron avalanche amplifier. Similarly, if the rejection is maintained, Applicants request that the Examiner indicate specific passages in Johnson that allegedly show such a condition.

For reasons stated above Applicants assert that all of the elements of claims 1 and 25 fail to be set forth in the embodiment shown in Johnson and, thus, Johnson fails to anticipate claims 1 and 25.

Applicant has already explained why Johnson fails to teach or suggest the invention of independent claims 1 and 25. Since claims 5-9, 11–12, 14, 17, 19-23 and 26-29 each depend, either directly or indirectly, from one of claim(s) 1 and 25, claims 2-3, 5-12, 14, 17, 19-23 and 26-29 are allowable at least for the reasons generally expressed above with respect to claim(s) 1 and 25.

In view of the above, Applicants respectfully request reconsideration and withdrawal of the outstanding rejection under 35 U.S.C. § 102 based on Johnson.

3. Rejections under 35 U.S.C. § 103 (a)

Claim 4 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Johnson (U.S. Patent No. 4,339,659 in view of Breskin et al. (U.S. Patent No. 5,192,861.

Claim 13 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Johnson (U.S. Patent No. 4,339,659) in view of Seppi et al. (U.S. Patent No. 5,692,507).

Claims 15 and 30 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Johnson (U.S. Patent No. 4,339,659) in view of Jacobs (U.S. Patent No. 3,710,125).

Claim 16 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Johnson (U.S. Patent No. 4,339,659) in view of Pitts et al. (U.S. Patent 5,602,397).

Claim 18 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Johnson (U.S. Patent No. 4,339,659) in view of Solberg et al. (U.S. Patent No. 5,614,722)

Claims 24 and 31 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Johnson (U.S. Patent No. 4,339,659) in view of Rieke (U.S. Patent No. 4,493,096) in view of Seppi et al. (U.S. Patent No. 5,692,507).

Claims 24 and 31 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Tosswill (U.S. Patent No. 4,608,519) in view of Rieke (U.S. Patent No. 4,493,096) in view of Seppi et al. (U.S. Patent No. 5,692,507). These rejections are respectfully traversed.

Applicants have already explained why Johnson and Tosswell fail to independently to contain the elements of independent claims 1 and 25. Breskin, Pitts, Jacobs, Solberg, Rieke, and Seppi likewise fail to contain the missing elements of independent claims 1 and 25, assuming these references are partly

combinable with Johnson or Tosswell, which Applicants do not admit. Specifically no reference cited discloses that the radiation can enter between the photocathode layer and the electron avalanche amplifier.

To establish a *prima facie* case obviousness (35 U.S.C. § 103), the Examiner has the burden of meeting the following three basic criteria: (1) the prior art must teach or suggest all of the claim limitations; (2) there must be a reasonable expectation of success; and (3) there must be some suggestion or motivation, either in the art or knowledge generally available to one of ordinary skill in the art to modify the reference or to combine teachings (M.P.E.P. § 2143)(emphasis added). Therefore, Applicants respectfully submit that the Examiner has not satisfied the *prima facie* requirement of showing a teaching or suggesting of all of the claimed limitations defined by independent claims 1 and 25 for the reasons discussed above.

Applicants have already explained why Johnson and Tosswell independently fail to teach or suggest the limits of independent claims 1 and 25. Since claims 4, 13, 15, 16, 18, 24, 30, and 31 each depend, either directly or indirectly, from one of claim(s) 1 and 25, claims 4, 13, 15, 16, 18, 24, 30, and 31 are allowable at least for the reasons generally expressed above with respect to claim(s) 1 and 25.

In view of the above, Applicants respectfully request reconsideration and withdrawal of the outstanding rejection of claims 4, 13, 15, 16, 18, 24, 30, and 31 under 35 U.S.C § 103(a).

Conclusion

In view of the above amendments and remarks, Applicants respectfully request reconsideration and withdrawal of the formal objections and rejections to the claims, and the rejections based on prior art. Because all claims are believed to define over prior art of record, Applicants respectfully request an early indication of allowability.

If the Examiner has any questions concerning this application, the Examiner is requested to contact the undersigned at (703) 205-8000 in the Washington, D.C. area.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayments to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. §§1.16 or 1.17; particularly, extension of time fees.

Respectfully submitted,

BIRCH, STEWART, KOLASCH & BIRCH, LLP

#40,439

By: _____
for Michael K. Mutter
Reg. No. 29,680

MKM/JPK/kmr

P.O. Box 747
Falls Church, VA 22040-0747
(703) 205-8000

MARKED UP VERSION TO SHOW CHANGES MADE

In the Specification:

The paragraph beginning on page 8, line 4, has been amended as follows:

-- A dielectric 49 may thus be arranged between avalanche cathode 21 and avalanche anode 27. This could be a gas or a solid substrate 49 carrying cathode 21 as shown in Fig. 2. The second voltage, which, during use, is applied between cathode 21 and anode 27, produces an electric field in a plurality of preferably gas-filled avalanche amplification regions 53. Electrical field lines between a single one of the readout elements 27 and the photocathode layer 18 are schematically indicated by reference numeral [55]51 in Fig. 2. The avalanche regions 53 are formed in a region between and around the edges of the avalanche cathode 21 which are facing each other, and between the avalanche cathode 21 and the avalanche anode 27, where, during use, a concentrated electric field will occur due to the applied voltages. --

The paragraph beginning on page 9, line 17, has been amended as follows:

-- In operation, the detector apparatus [21] 9 of Fig. 1 is positioned in the path of the radiation desired to be detected. Rays of incident radiation emanating directly from the subject under examination will travel in a path so as to pass through collimator 11 and enter photocathode layer 18, whereas unwanted radiation scattered from the subject under examination towards the detection device will typically travel at some angle to the plane of the collimator and thus will not be able to traverse collimator 11. --

The paragraph beginning on page 10, line 10, has been amended as follows:

-- The accelerated electrons will interact with other substance (e.g. atoms, molecules etc.) in section 13 and regions [59]53, causing electron-ion pairs to be produced. Those produced electrons will also be accelerated in the field, and will interact repetitively with new material, causing further electron-ion pairs to be produced. This process continues during the travel of the electrons in the avalanche region towards anode arrangement 27, 29 located at the bottom of the avalanche region, and in such way electron avalanches are formed.--

In the Claims:

Claims 1, 9, 11, 21, 25 and 30 have been amended. Claims 32 – 42 have been added. Claims 2, 3, and 10, 26 and 27 have been deleted.

1. (Amended) An apparatus for detection of radiation comprising:

- a photocathode layer having a first surface and being adapted to release photoelectrons in dependence on incident radiation;

- a radiation entrance arranged such that a beam of radiation can be entered into the apparatus through said radiation entrance and can impinge on said photocathode layer at grazing incidence;

- an electron avalanche amplifier facing the first surface of said photocathode and adapted to avalanche amplify photoelectrons released from said photocathode layer; and

- a readout arrangement adapted to detect avalanche amplified electrons from said amplifier, wherein

- said radiation entrance is arranged so that the beam of radiation can be entered into the apparatus between said photocathode layer and said electron avalanche amplifier and can impinge onto the first surface of said photocathode; and

- said photocathode layer is adapted to release photoelectrons from its first surface in response thereto.

9. (Amended) The apparatus as claimed in Claim 8 wherein the protective layer is provided with a thin[, preferably metallic,] layer, which is transparent to electrons and opaque to light.

11. (Amended) The apparatus as claimed in Claim 1 wherein the radiation entrance is arranged such that the beam of radiation can be entered into the apparatus and can impinge on said photocathode layer at a grazing angle α, which is lower than 500 mrad[, preferably in the interval 0.05-500 mrad, and more preferably in the interval 0.50-50 mrad].

25. (Amended) A method for detection of radiation in a detector apparatus comprising a radiation entrance, a photocathode layer, an electron avalanche amplifier, and a readout arrangement, said method comprising the steps of:

- introducing a beam of radiation into the detector apparatus through said radiation entrance such that said radiation beam impinges on a first surface of said photocathode layer at grazing incidence, wherein photoelectrons are released from said photocathode in response to said impinging radiation beam;

[- releasing photoelectrons by means of said photocathode layer;]

- avalanche amplifying the photoelectrons released from said photocathode layer by means of said electron avalanche amplifier; and

- detecting the avalanche amplified electrons by means of a readout arrangement, wherein

- said radiation beam is introduced into the apparatus between said photocathode layer and said electron avalanche amplifier; and

- the photoelectrons, which are avalanche amplified and subsequently detected, are released from the first surface of said photocathode layer.

29. (Amended) The method as claimed in Claim 25 wherein the beam of radiation is introduced such that it impinges on said photocathode layer at a grazing angle α, which is lower than 500 mrad[, preferably in the interval 0.05-500 mrad, and more preferably in the interval 0.50-50 mrad].

30. (Amended) The method as claimed in Claim 25 wherein the photoelectrons are avalanche amplified in an array of avalanche amplification regions filled with an avalanche amplification medium[, preferably an ionizable substance such as a gas or a gas mixture].